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## NOTES ON THRACIA CONRADI.

BY EDWARD S. MORSE.

For years I have hunted in vain for a living specimen of *Thracia conradi*. This year my friend John M. Gould has collected specimens alive in Portland associated with *Solenomya borealis*, and the expanded animal is so interesting that I am induced to publish these observations ahead of my other work on the subject. After storms I have repeatedly found the broken shells, often with the adductor muscles still adhering, but never a perfect specimen. The gulls immediately recognize the conspicuous white object on the beach and break the thin and fragile shell, devouring the fat morsel within. The gulls alone are not entirely responsible for the fractured shells. A live specimen was sent to me from Portland carefully packed in seaweed. It arrived with the umbonal region of one valve broken and the fractured portion standing at right angles to the vertical axis. Jeffreys reports the same feature in the British species of *Thracia*. He says: "The power of tension continually exercised by the strong and elastic cartilage exceeds that of the shell, and the latter being the weaker body gives away and is split in the conflict. Only one species (*T. distorta*), which is comparatively more solid than the others, resists the strain and remains uninjured."

For many years I have collected living specimens of New England mollusca for the purpose of drawing the expanded parts of the animal, and nearly all the larger, and many of the smaller species, have been drawn. I have been led to do this in the belief that the

soft parts are of more importance than the hard parts of a mollusk in any discussion of generic or other taxonomic considerations. The low features of the protobranchia would never have been suspected from the shell alone. The drawings of the soft parts of the lamellibranchs, thus far published, are in most instances valueless and misleading. An important exception to this statement is the work of Meyer and Möbius.<sup>1</sup> The beautiful drawings of the expanded animals have never been surpassed. The drawings of the soft parts of lamellibranchs in Forbes and Hanley's *British Mollusca*<sup>2</sup> are, with few exceptions, poor and misleading. In one case, indeed, the siphonal tubes are sticking out of the wrong end of the shell! As an illustration of the inaccuracy of most of the efforts of drawing the live creature, reference may be made to a drawing of *Lævicardium murtoni*, which appeared in Gould and Binney.<sup>3</sup> Where the drawing came from I do not know. In no way does it accord with the description of the animal credited to S. Smith, nor does it bear the faintest resemblance to the creature. This cut was reproduced in one of the U. S. Fish Commissioners reports<sup>4</sup> with no comment on its inaccuracy.

A study of the soft parts of Verrill's genus *Gastranella*, in a living state, revealed the fact that it was simply an early stage of *Petricola pholadiformis*, and with this hint I made a complete series of the shell from the extreme young to the adult. Dr. Dall had, however, come independently to the same conclusion regarding the identity of the two forms. With the exception of the classical work of William Clark on the *British Marine Testaceous Mollusca* the descriptions of the soft parts of mollusca, though rarely given, are usually inadequate and often incorrect. As an illustration of the character of some of this work, could anything be more absurd than the description of the animal of the genus *Thracia*, which may be found in a standard work on *British Mollusca*.<sup>5</sup> It embraces a line of four words and is given as a generic distinction, "Body oval, tubes separate."

In most of the earlier descriptions the siphonal openings of *Thracia* are described as fringed, and the figures of *Thracia phaseolina* and *distorta* in Forbes and Hanley show densely fringed openings. The figures, of course, are entirely wrong, as the descriptions quoted from Clark indicate. The description in Jeffreys of the animal of *T. papyracea* is the nearest correct of all I have yet encountered:

"Upper tube marked with 8 and the lower with 4 faint longitudinal lines or streaks, which terminate at the orifices in the same relative number of short, thick and blunt cirri."

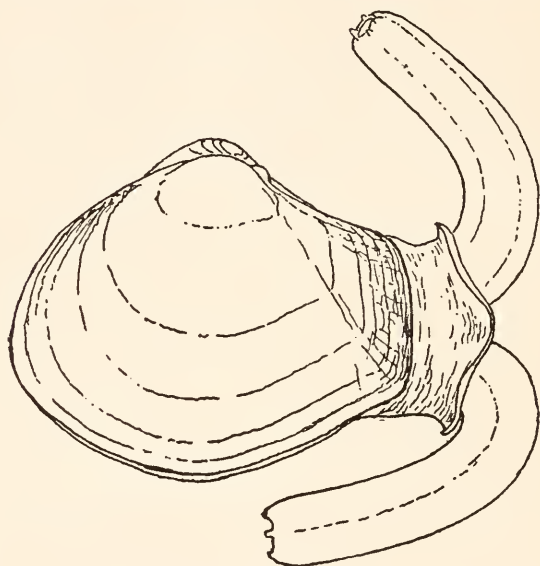
Allusions are made to the anatomy of the animal of *Thracia conradi* in comparing it with European species, but no figure of the expanded creature has ever been published. The nearest approach to a description of its habits is found in a monograph on the family *Osteodesmacea*, by Joseph P. Coulhony,<sup>6</sup> published seventy-five years ago. In this monograph is first defined *T. conradi* as a distinct species. He says: "The specimen of *Thracia* serving for the preceding description was obtained in the early part of March last with the living animal. It was buried about six inches below the surface at low-water mark. An accident deprived me of an opportunity to examine the animal, and repeated visits in search of another have been wholly unsuccessful." Professor Verrill says: "The species burrows so deep in the mud or sand that it is seldom taken alive with the dredge."

The specimen of *Thracia conradi* which I examined remained in a vessel of fresh sea water for three days without a sign of life. At one time the occupants of the house were away and there was no vibration caused by their moving about, and then for the first time the creature timidly thrust out its tubes. It was extremely sensitive to any jar, and placing the pencil ever so carefully on the table caused it to immediately retract. The tubes were entirely separate and nearly as long as the shell. The excurrent tube was bent in a sharp curve dorsally and the incurrent tube in a similar manner ventrally. This attitude never varied, and it occurred to me that buried in the sand it might rest its tubes on the surface as figured by Meyer and Möbius of *Scrobicularia piperata*. Clark in the above-mentioned work describes a similar attitude of the tubes in *Thracia phaseolina* as follows: \* \* \* "and posteriorly, for the issue of two moderately long siphons, which are separate nearly their length, but the animal always carries them in a divergent posture at the extremities \* \* \* the tubes are capable of great inflation." The tubes when fully expanded are white and translucent, the upper tube having its orifice surrounded by six short blunt tubercles, while the lower tube has its orifice surrounded by four similar tubercles. These terminate in faint longitudinal lines, marking the siphonal tubes precisely as described in the English species. At intervals the

tubes enlarge as if about to burst, becoming semi-globular at the ends; then suddenly collapsing the tubes become narrow and opaque-white in color. The tubes may perform this action independently.

In the description of the tubes of *Thracia distorta* a behavior is indicated precisely as seen in *T. conradi*. "Tubes globularly inflated at extremity, which increases whole length and then suddenly collapses."

The most marked peculiarity of *T. conradi* is the sharply defined collar which surrounds the base of the siphonal tubes. This collar



is a prolongation of the mantle, with an extension of the periostracum, as seen in many other lamellibranchs, but in no instance have I met with a description of any structure approaching the collar of *T. conradi*. It flares like the corolla of a flower, and its edges are reflected as shown in the figure here given. This prolongation of the posterior border of the mantle is seen in other forms, but in no case with the definition or freedom from the base of the siphonal tubes as seen in this species.

In *Saxicava* and *Mya* the prolongation of the mantle is closely adherent to the tubes. My own observations show that in *Anatina*

*papyracea* the mantle is prolonged at the siphonal end but does not surround the tubes like a collar, nor are its edges reflected. *Pandora trilineata* has a translucent envelope surrounding the base of the siphons and closely adherent. In *Yoldia limatula* and *Y. sapotilla* there are distinct lobes of the mantle flanking the sides of the tubes. In *Tagelus gibbus* there are two projecting and rounded lappets corresponding to the siphons. The siphonal collar of *T. conradi*, its separateness from the tubes and widely reflected edge is, so far as I know, unique among the lamellibranchs. Whether this feature should constitute a generic character I am not prepared to say. Dr. William Stimpson<sup>7</sup> in mentioning *T. conradi* says: "The absence of an ossiculum in the species would seem sufficient to separate it generically from other *Thraciæ*. But the animal resembles so closely that of the large English species which possess the ossiculum, that I have thought it best to consider the appendage unimportant."

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GUNDLACHIA HJALMARSONI PFR. IN THE RIO GRANDE, TEXAS.

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BY GEO. H. CLAPP.

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The above-mentioned *Gundlachia* was picked out of drift debris collected on the Texas side of the Rio Grande by Mr. R. D. Camp of Brownsville, Texas. It is associated in the trash with thousands of *Bifidaria*, *Thysanophora*, etcetera, over twenty-five species in all.